

Detection of earnings management in insurance companies in Slovakia

Lucia Svabova^{1,*}, and Roman Blazek¹

¹ University of Zilina, Faculty of Operation and Economics of Transport and Communications, Univerzitna 1, 010 26 Zilina, Slovakia

Abstract

Research background: Manipulation and the use of creative accounting or earnings management have become an increasingly popular topic in the history of researchers. Since 2002, this issue has attracted the attention of scientists and economists around the world. On the Slovak market, more than 30 insurance companies are actually operating, and some analyses have revealed that some of these insurance companies are engaging in activities that do not comply with the law.

Purpose of the article: The article aims to use selected models for the detection of fraudulent financial reporting to determine whether there are unfair activities in insurance companies in Slovakia. At the same time, we evaluate the reliability of selected models and recommend the best models for this sector.

Methods: Based on the set criteria, the Beneish model with five parameters and the Beneish model with eight parameters are applied to selected 20 companies in the Financial and Insurance activities sector to determine which companies have manipulated the financial statements. The analysis is performed using real data on Slovak companies from the Amadeus database.

Findings & Value added: For the Financial and Insurance activities industry, we recommend using the Beneish model with eight parameters. Comparing the two models, we can conclude that this model is more accurate and thorough. The reason is also that this model works with more data from the financial statements.

Keywords: *Beneish model; earnings manipulation, fraudulent financial reporting*

JEL Classification: *C52; D22; M41*

* Corresponding author: lucia.svabova@fpedas.uniza.sk

1 Introduction

Recently, reports of various types of fraud have become increasingly popular in the media. This involves corruption, misappropriation of assets or manipulation of financial statements. Therefore, it is perhaps not surprising that the rate of economic crime committed in companies increases yearly. Therefore, the fact remains that economic crime persists and disrupts all business processes, reduces credibility in the country's reputation, strives to maintain the company's rating and, most importantly, causes significant financial damage.

One of the mathematical-statistical tools that seek to detect the presence of fraudulent conduct using the financial statements of the company is the Beneish model. This model was published in 1999 and serves as a mathematical tool to uncover financial fraud that uses financial ratios as variables to identify whether a company has manipulated its earnings (Kenton, 2021). The paper aims to look into the issue of fraudulent conduct and use detection models to detect fraud to determine whether there are unfair activities in companies in the selected industry and then evaluate the reliability of selected models.

The rest of the paper is organised as follows. First, the literature review highlights the current studies aimed at the issue of earnings management or fraudulent financial reporting. Then, the next section describes the methodology and data used in this paper. Then, in the Results section, the results of the analysis are mentioned. Finally, the last section discusses the results and recommends using the models in Slovak companies or in selected sectors.

1.1 Literature review

The issue of earnings management or fraudulent financial reporting is very actual nowadays and is focused by analysts and economists worldwide. In Hsieh et al. (2020), the authors analysed the pension costs and cash contributions in the companies with defined benefits. The authors analysed the occurrence of earnings management by the companies managers by manipulation of the pensions accrual in order to achieve the required income. To detect manipulation in pension companies, the authors in the study used an aggregate discretionary pension rate. The authors developed a multivariate regression model for this aggregate pension income management measure used for the detection. In the study by Lebert et al. (2020), the authors tried to examine whether the rounding of net income and earnings per share in German companies is only some kind of "earnings cosmetics" or rather biased significant earnings management. The analysis is situated in the time of euro introduction in Germany. The results of the study showed that rounding-up of earnings is probably the result of earnings management. In the study of Li et al. (2020), the authors analysed the impact of the distance between the auditor and the client on the corporate real earnings management in Chinese listed firms and accounting firms. The authors found a positive association between real earnings management and the distance between the auditor and the client in the study. This association is even more observable in client companies with lower information transparency and higher business complexity. In their study, Tran et al. (2020) focused on Vietnamese commercial banks and analysed the relation between ownership structure factors and the occurrence of earnings management behaviour. The authors created a model for better identification of the earnings management in Vietnamese commercial banks, based on the least-squares method and other methods. In the study of Guggenmos and Stede (2020), the authors focused on the impact of creativity and innovation in companies on earning management. The result of the study is that managers in a more innovative corporate culture are more likely to use higher levels of real earnings management. In their study, Abdou et al. (2020) analysed the relation between corporate governance and earnings management in British and Egyptian

companies. The authors used conventional regressions as well as generalised regression neural networks. They also focused on the impact of quality management and control of corruption in companies and the occurrence of earnings management. In the study, the authors found that corruption has a very strong impact on earnings management. Moreover, state control of corruption level can discourage company managers from earnings management. In Slovakia, several author and their studies deal with the issue of earnings management and its detection, for example (Kliestik et al., 2020; Kovalova et al., 2019; Kramarova et al., 2019; Kramarova & Valaskova, 2020; Michalkova & Frajtova Michalikova, 2020; Poradova et al., 2019; Siekelova and Podhorska, 2020; Strakova, 2020; Strakova and Adamko, 2019; Svabova, Kramarova, et al., 2020; Svabova, Valaskova, et al., 2020).

2 Methodology and Data

In this paper, we use the Beneish model with five and the model with eight parameters. We will first focus on the model with five parameters, which the author originally created (Beneish, 1999). According to Kramarova and Valaskova (2020), Beneish's model is based on the probit regression and suggests perspectives regarding the tendency of companies to fraudulent accounting processes. Unegbu (2013) argues that the variables of the Beneish model have become the basis for various alternative ways of financial fraud in financial statements. This fact was also confirmed by the study of Papik and Papikova (2020), which also shows that manipulation was found in most of the input variables of the Beneish model. The model with five variables is given by the following formula for calculating the so-called *M*-score

$$M = -6,065 + 0,92 \cdot DSRI + 0,906 \cdot GMI + 0,593 \cdot AQI + 0,717 \cdot SGI + 0,107 \cdot DEPI \quad (1)$$

where

DSRI – Days Sales in Receivables Index

GMI – Gross Margin Index

AQI – Asset Quality Index

SGI – Sales Growth Index

DEPI – Depreciation Index

As the model with five parameters considers fewer data from the financial statements, it is also less accurate. Therefore, three other variables have been added to the model. As a result, the resulting Beneish model with eight parameters is given by the formula

$$M = -4,84 + 0,92 \cdot DSRI + 0,528 \cdot GMI + 0,404 \cdot AQI + 0,892 \cdot SGI + 0,115 \cdot DEPI - 0,172 \cdot SGAI + 4,679 \cdot TATA - 0,327 \cdot LVGI \quad (2)$$

where the following three variables were added to the variables in the previous model

SGAI – Sales, General, and Administrative Expenses Index

LVGI – Leverage Index

TATA – Total Accruals to Total Assets

According to Svabova et al. (2020), *M*-score lower than -2.22 indicates that the company did not manipulate the earnings and *M*-score higher than this value indicates that the company is likely to fraudulently manipulation of the financial statements.

As the Beneish model is a probabilistic model, it cannot detect companies that manipulate their revenues with 100% accuracy. Beneish thus found that 76% of companies where the earnings manipulation was practised were correctly identified by the model (Beneish,

1999). Furthermore, this detection ability of the model has been confirmed by several consequent studies, as reported in the study of Halilbegovic et al. (2020).

Kovalova and Frajtova Michalikova (2020), in their study, argue that this model with eight variables serves to identify whether a company has manipulated its revenues. The company's statements and, after calculation, create an M-score describing the extent to which the revenue has been manipulated. The basic theory on which Beneish bases this ratio is that companies are more likely to manipulate their profits if they demonstrate deterioration in gross margins, operating costs and leverage, along with strong sales growth. These factors can cause profit to be manipulated in a variety of ways.

In this study, we choose from the statistical classification of economic activities the sector K: Financial and insurance activities. One of the main reasons to focus on this area was the sharp rise in insurance fraud in 2021, caused by the poor economic situation associated with the COVID-19 pandemic, which brought more speculators to market. Moreover, new criteria have come into force in Slovakia this year that reduce the number of companies required to audit and increased criteria may lead to a deterioration in the quality of financial statements.

The data used in this study are generated from the AMADEUS financial database, which contains a range of information on companies across Europe. This database includes more than 21 mils of companies, while the Financial and Insurance Activities sector in Slovakia includes 82 companies. The years 2018, 2017, 2016 and 2015 represent the analysed years for the given industry, and the set criteria that the company must meet to be selected for this study are the following:

- the minimum value of total assets 2,000,000 €,
- the minimum value of sales 1,000,000 €,
- minimum net profit 100,000 €.

From the total number of companies, we found that 24 companies meet these criteria, but as we lacked the necessary data for four companies and their analysis would give irrelevant results, we decided to exclude the companies and analyse Beneish models in 20 companies from the selected sector.

3 Results

To get the value of the *M*-score with five parameters for the selected companies, it is necessary to calculate the indicators: *DSRI*, *GMI*, *AQI*, *SGI* and *DEPI*, while in the case of the *M*-score with eight parameters it is necessary to add the other three to the previous parameters, namely: *SGAI*, *LVGI* and *TATA*. All of these indicators help auditors to detect whether the financial data were manipulated. Furthermore, the calculated values of the variables allow us to calculate the Beneish *M*-score of both models in the observed sector K. Using formulas (1) and (2), we determine the *M*-score of the monitored companies for individual years.

By comparing the value of the *M*-score with the threshold value of -2.22 , we find that in 2016, one company exceeded this value, representing 5% of the sample. The remaining 19 companies (95%) are below the set limit, and we can consider them as reliable companies where manipulation with financial statements has not been discovered. In the following year, 2017, 2 companies (10%) were included in the group of manipulators and 18 companies (90%) in the group of non-manipulators. The situation in the last analysed year did not change. As in the previous year, 10% of enterprises exceeded the set value and were marked as manipulators, and 90% of enterprises did not exceed this value. The following figure shows the *M*-scores together with the threshold value (black line) for the sample of companies.

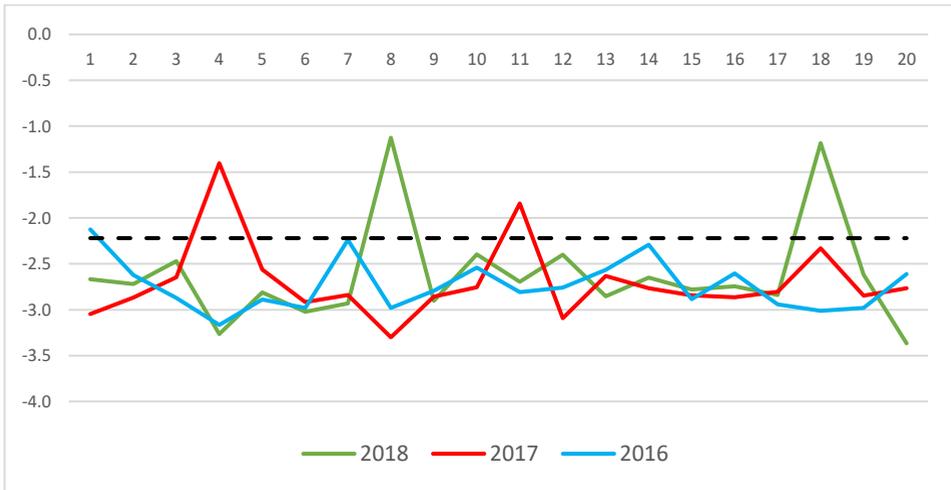


Figure 1. M-score of the Beneish model with five parameters for companies in sector K.

Source: author (2021)

The results with the application of the Beneish model with eight parameters are in Figure 2.

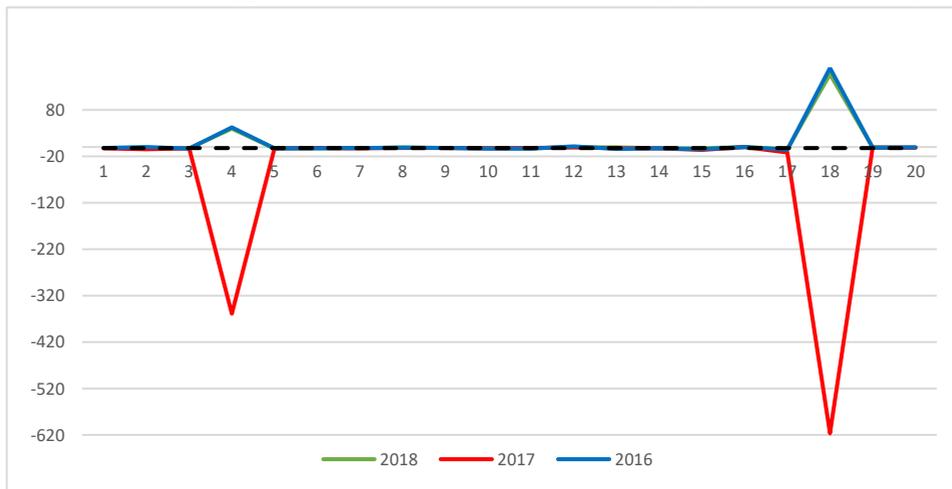


Figure 2. M-score of the Beneish model with eight parameters for companies in sector K.

Source: author (2021)

In contrast to the previous model, up to 11 companies (55%) in 2016 were detected as manipulators of their financial statements, and the remaining nine companies (45%) did not commit any manipulation. The situation slightly improved in 2017, where the limit of the manipulation indicator was exceeded by seven enterprises (35%), and the rest 13 enterprises (65%) were included in the group of non-manipulators. Finally, the balanced year was 2018, where 50% of the companies were detected as manipulators, and the remaining 50% were detected as non-manipulators.

4 Discussion and conclusion

In Slovakia, more studies focus on the suitability of the model for detecting earnings management or manipulation in the companies in Slovakia or neighbouring countries.

Based on the results of the studies, we can say that the Modified Jones model is suitable for this purpose, meeting four of the five criteria, namely the coefficient of determination, the statistical significance of variables, standard deviation and the level of statistical significance of the model. The fifth criterion that this model did not meet is the predicted sign of the variables (Kliestik, Belas, et al., 2021; Kliestik, Nica, et al., 2021; Kramarova and Valaskova, 2020; Strakova and Adamko, 2019). Strakova (2019) identified the Kothari model as the most suitable one for the Czech Republic, the only one of the examined models that meets all the five criteria. In the study of Kliestik, Nica et al. (2021), the authors analysed the issue of earnings management in Slovak and Polish economic conditions and used models to determine corporate income manipulation, concluding that for Polish conditions, the most suitable model is the Keyou model.

In the case of the analysed industry K: Financial and insurance activities, which we focused on in this article, we recommend using the Beneish model with five parameters and the Beneish model with eight parameters when performing the audit, as we found that the model can effectively detect fraudulent financial reporting in the organisation. However, compared to the results of the five-parameter model, we can say that the detection of fraud by this model is weaker since the model works with fewer data. Therefore, we recommend using the Beneish model with eight parameters in the judiciary, in the financial administration in case of an anonymous inspection report or by the auditor in auditing the financial management.

Acknowledgements

This research was financially supported by the Slovak Research and Development Agency – Grant NO. APVV-17-0546: Variant complex model of Earnings management in conditions of Slovak republic as an essential tool of the market uncertainty.

References

1. Abdou, H. A., Ellelly, N. N., Elamer, A. A., Hussainey, K., & Yazdifar, H. (2020). Corporate governance and earnings management nexus: Evidence from the UK and Egypt using neural networks. *International Journal of Finance & Economics*, forthcoming article.
2. Beneish, M. D. (1999). The detection of earnings manipulation. *Financial Analysts Journal*, 55(5), 24–36.
3. Guggenmos, R. D., & Stede, W. A. V. der. (2020). The Effects of Creative Culture on Real Earnings Management. *Contemporary Accounting Research*.
4. Halilbegovic, S., Celebic, N., Cero, E., Buljubasic, E., & Mekic, A. (2020). Application of Beneish M-score model on small and medium enterprises in Federation of Bosnia and Herzegovina. *Eastern Journal of European Studies*, 11(1), 146–163.
5. Hsieh, S.-J., Su, Y., & Chang, C.-C. A. (2020). The role of discretionary pension accruals in earnings management. *Journal of Applied Accounting Research*, ahead-of-print(ahead-of-print).
6. Kenton, W. (2021). *Defining the Beneish Model*. Investopedia. <https://www.investopedia.com/terms/b/beneishmodel.asp>
7. Kliestik, T., Belas, J., Valaskova, K., Nica, E., & Durana, P. (2021). Earnings management in V4 countries: The evidence of earnings smoothing and inflating. *Economic Research-Ekonomska Istraživanja*, 34(1), 1452–1470.

8. Kliestik, T., Nica, E., Adamko, P., Valaskova, K., & Kovacova, M. (2021). Investigation of earnings management based on unique country samples. *European Journal of International Management, forthcoming article*.
9. Kliestik, T., Valaskova, K., Nica, E., Kovacova, M., & Lazaroiu, G. (2020). Advanced methods of earnings management: Monotonic trends and change-points under spotlight in the Visegrad countries. *Oeconomia Copernicana, 11(2)*, 371–400.
10. Kovalova, E., & Frajtova Michalikova, K. (2020). The creative accounting in determining the bankruptcy of Business Corporation. *SHS Web of Conferences, 74*, 01017.
11. Kovalova, E., Kramarova, K., & Zabochnik, S. (2019). Detection of Earnings Manipulation Using Beneish M-Score Model. *Proceedings of the 34th International Business Information Management Association Conference (IBIMA)*, (pp. 10827–10832).
12. Kramarova, K., Kovalova, E., & Michalkova, L. (2019). Artificial Pricing of Intragroup Transactions in Context of Earnings Management – Slovak Legal Framework. *Proceedings of the 34th International Business Information Management Association Conference (IBIMA)*, (pp. 13121–13133).
13. Kramarova, K., & Valaskova, K. (2020). Application of chosen fraudulent detection technique in the Slovak business environment. *SHS Web of Conferences, 74*, 01019.
14. Lebert, S., Mohrmann, U., & Stefani, U. (2020). Rounding up performance measures in German firms: Earnings cosmetics or earnings management on a larger scale? *Journal of Business Finance & Accounting*, 1–23.
15. Li, X., Lin, Z., & Luo, J. (2020). Does auditor-client distance matter to real earnings management? Evidence from China. *Asia-Pacific Journal of Accounting & Economics, 27(5)*, 531–557.
16. Michalkova, L., & Frajtova Michalikova, K. (2020). Is the Value of the New Business Tax Shield Lower? Comparative Study of International Valuation Methods. *SHS Web of Conferences, 74*, 01022.
17. Papik, M., & Papikova, L. (2020). Detection models for unintentional financial restatements. *Journal of Business Economics and Management, 21(1)*, 64–86.
18. Poradova, M., Sielekova, A., & Kollar, B. (2019). Theoretical Aspects of Earnings Management Models. *Proceedings of the 34th International Business Information Management Association Conference (IBIMA)*, (pp. 13110–13120).
19. Siekelova, A., & Podhorska, I. (2020). Earnings Indicators under the Condition of Globalization. *SHS Web of Conferences, 74*, 01031.
20. Strakova, L. (2020). Earnings management in global background. *SHS Web of Conferences, 74*, 01032.
21. Strakova, L., & Adamko, P. (2019). Application of Earnings Management Models in the Slovak Republic. *Proceedings of the 34th International Business Information Management Association Conference (IBIMA)*, (pp. 13386–13398).
22. Svabova, L., Kramarova, K., Chutka, J., & Strakova, L. (2020). Detecting earnings manipulation and fraudulent financial reporting in Slovakia. *Oeconomia Copernicana, 11(3)*, 485–508.
23. Svabova, L., Valaskova, K., Durana, P., & Kliestik, T. (2020). Dependency analysis between various profit measures and corporate total assets for Visegrad group's business entities. *Organizacija, 53(1)*, 80–90.

24. Tran, T. Q., Ly, A. H., & Nguyen, D. K. N. (2020). Relationship between Ownership Structures and Earnings Management Behavior in Vietnamese Commercial Banks. *The Journal of Asian Finance, Economics, and Business*, 7(9), 401–407.
25. Unegbu, A. O. (2013). Advances in Modeling for Falsified Financial Statements. *International Journal of Finance and Accounting*, 2(1), 37–54.